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09/781,730	02/12/2001	Donald S. Farquhar	EN9-98-122US3	8946
5409	7590	06/08/2005	EXAMINER	
ARLEN L. OLSEN SCHMEISER, OLSEN & WATTS 3 LEAR JET LANE SUITE 201 LATHAM, NY 12110			GOFF II, JOHN L	
			ART UNIT	PAPER NUMBER
			1733	
DATE MAILED: 06/08/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/781,730

Applicant(s)

FARQUHAR ET AL.

Examiner

John L. Goff

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 23,25,32,33,35 and 58-74 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23,25,32,33,35 and 58-74 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This action is in response to the amendment filed on 2/25/05. The previous 35 USC 112 rejections have been overcome.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 35, 58-68, and 71 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 35, 65, and 71 require "solvent having a molecular weight not exceeding the molecular weight of methyl ethyl ketone". It is unclear where in the specification this limitation is disclosed, it being noted the specification does disclose the specific use of methyl ethyl ketone as the solvent (Page 9, line 23). Claim 58 requires "the contrasting dye facilitates a visual contrast in the visible portion of the electromagnetic spectrum between the conductive layer and the fluoropolymer matrix". It is unclear where in the specification this limitation is disclosed, it being noted the specification does disclose the use of "contrasting

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pigment” as opposed to “contrasting dye”. However, the specification does not disclose that either a dye or pigment is required to be visible in the visible portion of the electromagnetic spectrum, and furthermore, dyes and pigments are not required to be visible and may be transparent, i.e. not visible in the visible portion of the electromagnetic spectrum (See column 5, lines 16-19 of Kaye U.S. Patent 3,713,870 as exemplary of the use of transparent dye and/or pigment).

5. Claims 33, 68, and 74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims require “liquid inorganic particles”. It is unclear what is required by a liquid particle. The examiner has interpreted the claim to require inorganic particles in a liquid carrier.

***Claim Rejections - 35 USC § 103***

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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7. Claims 23 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (U.S. Patent 4,747,897) in view of JP 02145335 (See also the English abstract for JP 02145335).

Johnson is directed to a method of bonding a dielectric material comprising polytetrafluoroethylene (PTFE) to a conductor such as a copper foil by impregnating the dielectric material with a liquid thermosetting resin. Johnson teaches a dielectric material comprising a fluorocarbon such as PTFE and filler material such as ceramic, glass, metal, carbon, etc. (Column 3, lines 5-16). Johnson teaches a liquid thermosetting resin such as epoxy, polyimide, polyamide, etc. (Column 3, lines 3-5). Johnson teaches coating the dielectric material with the thermosetting resin (Column 6, lines 29-31). The resin fills the interstices within the dielectric material and forms an even coating of resin on the materials surfaces (Column 7, lines 37-41). The coated dielectric material is heated to affect a B-stage cure (Column 4, lines 49-55 and Column 6, lines 32-34), and a dry, resin impregnated dielectric sheet is formed. The sheet is then placed, i.e. provided, between one or two sheets of copper foil (Column 4, lines 59-63 and Column 6, lines 47-53), and bonded through the application of heat (175 °C) and pressure (100-800 PSI) (Column 7, lines 53-58 and Column 8, lines 7-10). The laminate can be fabricated into a single or double-sided printed circuit board (Column 4, lines 66-68). It is noted a layer of resin is present on each surface of the dielectric material (bonded or not) after lamination because if the layer were not present the circuit board would delaminate (Figure 8 and Column 8, lines 1-4). Johnson does not specifically recite also coating the conductor with the thermosetting resin. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the conductor taught by Johnson with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two,

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it being noted additional reference is made to JP 02145335 to show coating the conductor with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two was a well known technique in the art.

JP 02145335 discloses forming a circuit board by coating a conductor layer and a prepreg with thermosetting resin (e.g. epoxy) and solvent, drying to remove the solvent, and laminating the two to form a circuit board having high peel strength (See the abstract).

8. Claims 25 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and JP 02145335 as applied to claims 23 and 32 above, and further in view of either the admitted prior art (Specification pages 1-3 and page 8, lines 10-13) or Swei et al. (U.S. Patent 5,374,453).

Johnson and JP 02145335 as applied above teach all of the limitations in claims 25 and 33 except for a teaching on the specific properties of the dielectric material such as the shape, size, or method of applying the inorganic filler material/particles. The admitted prior art discloses a known dielectric material including inorganic filler particles is manufactured by Rogers Corporation. The admitted prior art teaches the known dielectric material comprises PTFE and inorganic filler particles wherein the particles are applied to the PTFE with a liquid carrier as a dispersion, the particles are spherical in shape, and the particles have a diameter of less than 10 microns (Specification pages 1-3 and page 8, lines 10-13). Swei et al. (assigned to Rogers Corporation) discloses a known dielectric material comprising PTFE and inorganic filler particles. Swei et al. teach the particles are applied to the PTFE with a liquid carrier as a dispersion, the particles are spherical in shape, and the particles have a diameter of less than 10 microns (Column 3, lines 20-35 and 46-62 and Column 4, lines 18-26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the

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dielectric material taught by Johnson as modified by JP 02145335 the dielectric material suggested by either the admitted prior art or Swei et al. as only the expected results would be achieved.

9. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and JP 02145335 as applied to claims 23 and 32 above, and further in view of Abe et al. (U.S. Patent 4,495,017).

Johnson and JP 02145335 as applied above teach all of the limitations in claim 35 except for a specific teaching of a solvent included when applying the thermosetting resin. However, the resin would intrinsically include a solvent in view of the following: (1) Johnson teaches the thermosetting resin is applied as liquid, i.e. the resin is not applied as a melt and (2) After coating the dielectric material with the liquid thermosetting resin Johnson teaches the coated dielectric is dried such that if the resin were applied in a melt form there would be no need to dry the coated dielectric, it being noted additional reference is made to Abe et al. and JP 02145335 to show thermosetting resins applied in the manner described by Johnson included solvent. Regarding the particular solvent, absent any unexpected results it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any well known solvent for use with a thermosetting resin for resin impregnating prepreg such as methyl ethyl ketone, whose use is shown for example by Abe et al., as only the expected results would be achieved.

Abe et al. teach forming a B-stage prepreg by two processes: (1) a wet process wherein a base material is wet with a resin dissolved in a solvent followed by drying the base material to remove the solvent and form a B-stage prepreg and (2) a dry process wherein a thermosetting resin is applied as a powder or paste to a base material followed by heating to melt the resin and

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form a B-stage prepreg (Columns 1 and 2). It is noted the process disclosed by Johnson is that of process (1) described by Abe et al. wherein the resin is applied to the base material as a liquid, i.e. wet, and the base is then heated to form a dry B-staged prepreg. Abe et al. further teach well known solvents for use with thermosetting resins in process (1) include methyl ethyl ketone (Column 1, lines 22-31).

10. Claims 58, 59, 61, and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of IBM ("Computer-Controlled Optical Testing of High-Density Printed-Circuit Boards").

Johnson is described above in full detail. Johnson is silent as to including a visible contrasting dye in the thermosetting resin. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the thermosetting resin taught by Johnson a visible contrasting dye as was known in the art as shown for example by IBM wherein including a visible (e.g. at 570 nm) contrasting dye in the resin facilitates a visual contrast in the visible portion of the electromagnetic spectrum between the conductor and the resin-impregnated dielectric and allows easy visual inspection of the circuit board.

IBM is exemplary in the art of a thermoset resin impregnated dielectric layer used to manufacture a circuit board wherein the thermoset resin includes a visible (e.g. at 570 nm) contrasting dye such that the dye allows easy visual inspection of the circuit board (Page 52, column 2, second paragraph).



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11. Claims 60 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and IBM as applied to claims 58, 59, 61, and 66 above, and further in view of JP 02145335.

Johnson and IBM as applied above teach all of the limitations in claims 60 and 62 except for a specific recitation of additionally coating the conductor with the thermosetting resin.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the conductor taught by Johnson as modified by IBM with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two, it being noted additional reference is made to JP 02145335 to show coating the conductor with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two was a well known technique in the art. JP 02145335 is described above in full detail.

12. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, IBM, and JP 02145335 as applied to claims 60 and 62 above, and further in view of Sanjana et al. (U.S. Patent 4,590,539) and optionally Abe et al.

Johnson, IBM, and JP 02145335 as applied above teach all of the limitations in claim 63 except for a specific recitation of a solvent included when applying the thermosetting resin and a teaching of adjusting the viscosity of the thermosetting resin and solvent, i.e. "varnish".

However, the resin would intrinsically include a solvent in view of the following: (1) Johnson teaches the thermosetting resin is applied as liquid, i.e. the resin is not applied as a melt and (2) After coating the dielectric material with the liquid thermosetting resin Johnson teaches the coated dielectric is dried such that if the resin were applied in a melt form there would be no need to dry the coated dielectric, it being noted additional reference is made to (optionally) Abe

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et al. and JP 02145335 to show thermosetting resins applied in the manner described by Johnson included solvent. As to the particular viscosity of the varnish, i.e. resin and solvent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the viscosity of the varnish taught by Johnson as modified by IBM, JP 02145335, and optionally Abe et al. as a function of the desired resin content of the prepreg as was known in the art and shown for example by Sanjana et al.

Sanjana et al. are exemplary in the art of forming a prepreg by impregnating a dielectric material with a varnish, i.e. resin and solvent, wherein the viscosity of the varnish is adjusted to a selected amount to provide the prepreg with a desired resin content (Column 2, lines 17-18 and 47-49 and Column 3, lines 32-38 and Column 4, lines 30-33).

13. Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and IBM as applied to claims 58, 59, 61, and 66 above, and further in view of Sanjana et al. and optionally either Abe et al. or JP 02145335 or both.

Johnson and IBM as applied above teach all of the limitations in claim 64 except for a specific recitation of a solvent included when applying the thermosetting resin and a teaching of adjusting the viscosity of the thermosetting resin and solvent, i.e. "varnish". However, the resin would intrinsically include a solvent in view of the following: (1) Johnson teaches the thermosetting resin is applied as liquid, i.e. the resin is not applied as a melt and (2) After coating the dielectric material with the liquid thermosetting resin Johnson teaches the coated dielectric is dried such that if the resin were applied in a melt form there would be no need to dry the coated dielectric, it being noted additional reference is made to (optionally) Abe et al. and/or (optionally) JP 02145335 to show thermosetting resins applied in the manner described by

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Johnson included solvent. As to the particular viscosity of the varnish, i.e. resin and solvent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the viscosity of the varnish taught by Johnson as modified by IBM and optionally Abe et al. and/or JP 02145335 as a function of the desired resin content of the prepreg as was known in the art and shown for example by Sanjana et al. IBM, Abe et al., JP 02145335, and Sanjana et al. are described above in full detail.

14. Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and IBM as applied to claims 58, 59, 61, and 66 above, and further in view of Abe et al. and optionally JP 02145335.

Johnson and IBM as applied above teach all of the limitations in claim 65 except for a specific teaching of a solvent included when applying the thermosetting resin. However, the resin would intrinsically include a solvent in view of the following: (1) Johnson teaches the thermosetting resin is applied as liquid, i.e. the resin is not applied as a melt and (2) After coating the dielectric material with the liquid thermosetting resin Johnson teaches the coated dielectric is dried such that if the resin were applied in a melt form there would be no need to dry the coated dielectric, it being noted additional reference is made to Abe et al. and (optionally) JP 02145335 to show thermosetting resins applied in the manner described by Johnson included solvent.

Regarding the particular solvent, absent any unexpected results it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any well known solvent for use with a thermosetting resin for resin impregnating prepreg such as methyl ethyl ketone, whose use is shown for example by Abe et al., as only the expected results would be achieved. Abe et al. and JP 02145335 are described above in full detail.

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15. Claims 67 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson and IBM as applied to claims 58, 59, 61, and 66 above, and further in view of either the admitted prior art or Swei et al.

Johnson and IBM as applied above teach all of the limitations in claims 67 and 68 except for a teaching on the specific properties of the dielectric material such as the shape, size, or method of applying the inorganic filler materials/particles. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the dielectric material taught by Johnson as modified by IBM the dielectric material suggested by either the admitted prior art or Swei et al. as only the expected results would be achieved. The admitted prior art and Swei et al. are described above in full detail.

16. Claims 69 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Sanjana et al. and optionally either Abe et al. or JP 02145335 or both.

Johnson is described above in full detail. Johnson is silent as to a specific recitation of a solvent included when applying the thermosetting resin and a teaching of adjusting the viscosity of the thermosetting resin and solvent, i.e. "varnish". However, the resin would intrinsically include a solvent in view of the following: (1) Johnson teaches the thermosetting resin is applied as liquid, i.e. the resin is not applied as a melt and (2) After coating the dielectric material with the liquid thermosetting resin Johnson teaches the coated dielectric is dried such that if the resin were applied in a melt form there would be no need to dry the coated dielectric, it being noted additional reference is made to (optionally) Abe et al. and/or (optionally) JP 02145335 to show thermosetting resins applied in the manner described by Johnson included solvent. As to the particular viscosity of the varnish, i.e. resin and solvent, it would have been obvious to one of

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ordinary skill in the art at the time the invention was made to adjust the viscosity of the varnish taught by Johnson as modified by optionally Abe et al. and/or JP 02145335 as a function of the desired resin content of the prepreg as was known in the art and shown for example by Sanjana et al. Abe et al., JP 02145335, and Sanjana et al. are described above in full detail.

17. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, Sanjana et al., optionally Abe et al., and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of JP 02145335.

Johnson, Sanjana et al., and optionally Abe et al. and/or JP 02145335 as applied above teach all of the limitations in claim 70 except for a specific recitation of coating the conductor with the thermosetting resin. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the conductor taught by Johnson as modified by Sanjana et al., and optionally Abe et al. and/or JP 02145335 with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two, it being noted additional reference is made to JP 02145335 to show coating the conductor with thermosetting resin in addition to impregnating the dielectric layer with thermosetting resin to form a strong bond between the two was a well known technique in the art. JP 02145335 is described above in full detail.

18. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, Sanjana et al., optionally Abe et al., and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of Abe et al.

Johnson, Sanjana et al., and optionally Abe et al. and/or JP 02145335 as applied above teach all of the limitations in claim 71 except for a specific teaching of the particular solvent

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included when applying the thermosetting resin. Absent any unexpected results it would have been obvious to one of ordinary skill in the art at the time the invention was made to use in Johnson as modified by Sanjana et al., and optionally Abe et al. and/or JP 02145335 any well known solvent for use with a thermosetting resin for resin impregnating prepreg such as methyl ethyl ketone, whose use is shown for example by Abe et al., as only the expected results would be achieved.

19. Claims 73 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, Sanjana et al., optionally Abe et al., and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of either the admitted prior art or Swei et al.

Johnson, Sanjana et al., and optionally Abe et al. and/or JP 02145335 as applied above teach all of the limitations in claims 73 and 74 except for a teaching on the specific properties of the dielectric material such as the shape, size, or method of applying the inorganic filler particles. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the dielectric material taught by Johnson as modified by Sanjana et al., and optionally Abe et al. and/or JP 02145335 the dielectric material suggested by either the admitted prior art or Swei et al. as only the expected results would be achieved. The admitted prior art and Swei et al. are described above in full detail.

### ***Response to Arguments***

20. Applicant's arguments with respect to claims 23, 25, 32, 33, 35, and 28-74 have been considered but are moot in view of the new ground(s) of rejection. It is noted applicants

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arguments address newly added limitations, and the new rejections above address the new limitations.

***Conclusion***

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **(571) 272-1216**. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

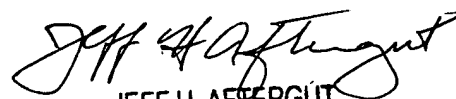
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on (571) 272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John L. Goff



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